

laid on the transparent area 21b except the first pins 21a. The circuit laid on the transparent area 21b, such as a wide area copper as ground wire on the opposite side of the printed circuit board 20, will block the observation of the joining of the first pins 21a and second pins 31a.

[0019] On the tape carrier package (TCP) 30 in FIG. 2, there are driving circuits 31 for driving the LCD panel 10, and a plurality of second pins 31a that is designed for joining to the first pins on the printed circuit board 20 correspondingly. The tape carrier package 30 is coupled to the LCD panel 10 and the second pins 31a thereon are joined to the first pins 21a to assemble the tape carrier package 30 and the printed circuit board 20. The first pins 21a and the second pins 31a are joined together by anisotropic conductive film or solder. The amount of the tape carrier packages 30 and the second pins 31a thereon depends on the number of pixels displayed in the LCD panel 10's selected resolution.

[0020] As illustrated in FIG. 3, the joining accuracy of an LCD apparatus is observed through the transparent area 21b in one embodiment of the present invention. When the first pins 21a and the second pins 31a are joined together by anisotropic conductive film or solder, the joining accuracy can be observed from the top of TCP 30 that is right above the transparent area 21b by projecting a light 40 to penetrate the transparent area 21b. If the second pins 31a are not joined right above the first pins 21a precisely, the shadows of non-overlapping area of the second pins 31a project onto the transparent area 21b.

[0021] As illustrated FIG. 4, the method of checking the joining accuracy of an LCD apparatus first comprises the step S1: providing a transparent area on the printed circuit board 20, wherein the transparent area 21b is on a coupling region on the circuit board 20 and there is at least one first pin 21a within the transparent area 21b. And then perform step S2: checking the joining accuracy through the transparent area. Since the pins on the LCD apparatus are tiny and dense, a microscope can be used to checking the joining accuracy and the shift of the second pins 31a can be measured by a ruler inside the microscope.

[0022] It is simple and quick to check the joining accuracy of an LCD apparatus according to the present invention. If the second pins 31a are not joined with the first pins 21a correspondingly, the joining quality of the pins 21a and 31a of the LCD apparatus is not qualified.

[0023] The foregoing description of the preferred embodiments of this invention has been presented for purposes of illustration and description. Obvious modifications or variations are possible in light of the above teaching. The embodiments were chosen and described to provide the best illustration of the principles of this invention and its practical application to thereby enable those skilled in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the present invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally, and equitably entitled.

What is claimed is:

1. A liquid crystal display (LCD) apparatus, comprising:
 - an LCD panel;
 - a printed circuit board with a coupling region which comprises a plurality of first pins thereon, wherein at least one segment of the coupling region comprises a transparent area and at least one first pin within the transparent area; and
 - a package unit coupled to the LCD panel with a plurality of second pins thereon corresponding to the first pins, wherein the second pins are electrically joined to the first pins and the joining accuracy is observed through the transparent area.
2. The LCD apparatus as claimed in claim 1, wherein the package unit is a tape carrier package (TCP).
3. The LCD apparatus as claimed in claim 2, wherein the package unit comprises a driving circuit thereon for driving the LCD panel.
4. The LCD apparatus as claimed in claim 3, wherein the printed circuit board comprises a control circuit thereon for controlling the driving circuit.
5. The LCD apparatus as claimed in claim 4, wherein the second pins are electrically connected to the first pins by an anisotropic conductive film (ACF).
6. The LCD apparatus as claimed in claim 4, wherein the second pins are electrically connected to the first pins by solder.
7. A method for checking joining accuracy of a plurality of first pins on a coupling region of a printed circuit board and a plurality of second pins on a package unit, wherein the package unit is coupled to an LCD panel with the second pins thereon corresponding to the first pins for electrically connecting printed circuit board and the LCD panel, the method comprising the steps of:
 - providing a transparent area on at least one segment the coupling region and at least one first pin within the transparent area; and
 - checking the joining accuracy of the first pin and the corresponding second pin through the transparent area.
8. The method as claimed in claim 7, wherein the package unit is a tape carrier package (TCP).
9. The method as claimed in claim 8, wherein the package unit comprises a driving circuit thereon for driving the LCD panel.
10. The method as claimed in claim 9, wherein the printed circuit board comprises a control circuit thereon for controlling the driving circuit.
11. The method as claimed in claim 10, wherein the second pins are electrically connected to the first pins by an anisotropic conductive film (ACF).
12. The method as claimed in claim 10, wherein the second pins are electrically connected to the first pins by solder.

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